REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1, 12 and 13 are amended. Support for these amendments can be found at least in the specification in paragraph [0006]. New claim 14 has been added. Support for this amendment can be found at least in the specification in paragraph [0074]. No new matter is added.

A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Claims 1-9 and 11-14 are now pending in this application.

Rejections under 35 U.S.C. § 103

Claims 1, 2, 5-9, and 11-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 1,174,600 A2 to Kobayashi et al. ("Kobayashi") in view of U.S. Patent No. 5,974,791 to Hirota ("Hirota") and U.S. Patent No. 6,237,326 to Russell ("Russell"). Claims 3 and 4 stand rejected under § 103(a) as being unpatentable over Kobayashi in view of Hirota and Russell, and further in view of certain legal precedent. Applicants respectfully traverse these rejections for at least the following reasons.

The device of claim 1 is configured to perform lean air-fuel ratio operation of a diesel engine when a trapped amount of particulate matter in a filter becomes sufficiently large to partially regenerate the filter, when the engine is operated with a rich air-fuel ratio for the purpose of eliminating sulfur oxide poisoning of the catalyst, and then to resume the rich air-fuel ratio operation to continue the elimination of sulfur oxide poisoning. In particular, with respect to the partial regeneration of the filter during the lean operation, claim 1, as amended recites a programmable controller programmed to "determine whether or not the particulate matter trap amount has reached a predetermined decrease state during a period when the exhaust gas composition is in the state corresponding to the lean air-fuel ratio, the

predetermined decrease state corresponding to a particulate matter trap amount smaller than the predetermined amount and larger than zero and corresponding to a particulate matter trap amount which, when burned, does not cause the temperature of the diesel particulate filter to exceed a predetermined preferable range for particulate trap performance."

The Office Action apparently recognizes that Kobayashi does not disclose controlling an air-fuel ratio mechanism to perform lean air-fuel ratio operation of a diesel engine when a trapped amount of particulate matter in a filter becomes sufficiently large to partially regenerate the filter, when the engine is operated with a rich air-fuel ratio for the purpose of eliminating sulfur oxide poisoning of the catalyst, and then to resume the rich air-fuel ratio operation to continue the elimination of sulfur oxide poisoning. The Office Action, however, provides Russell for allegedly disclosing this feature. Applicants submit that Russell does not cure the deficiencies of Kobayashi, because Russell does not disclose or suggest in the context of partial DPF regeneration within a sulfur oxide poisoning elimination process, "[determining] whether or not the particulate matter trap amount has reached a predetermined decrease state during a period when the exhaust gas composition is in the state corresponding to the lean air-fuel ratio, the predetermined decrease state corresponding to a particulate matter trap amount smaller than the predetermined amount and larger than zero and corresponding to a particulate matter trap amount which, when burned, does not cause the temperature of the diesel particulate filter to exceed a predetermined preferable range for particulate trap performance."

Russell discloses in FIG. 7 a routine for deactivating particulate filter regeneration, where the deactivation may occur depending alternately on different parameter criteria. In particular, in step 712 a determination is made as to whether stored particulate matter (spa) is less than a limit amount S4, or whether a catalyst temperature (Tc) is greater than a limit T5, or whether particulate temperature during nonregeneration operation (Tpn) is less than limit T6 and the stored particulate amount is less than limit S6 (col. 6, lines 25-36). None of these parameter criteria, however, meet the above recited limitations of claim 1.

With respect to criteria regarding S4 and the stored particulate matter spa, Russell discloses when the spa is less than amount S4, i.e., when the answer to step 712 is YES, the

regeneration is deactivated, and a regeneration flag unset (col. 6, lines 53-55). Russell does not disclose or suggest, however, that amount S4 should be set to correspond to "a particulate matter trap amount which, when burned, does not cause the temperature of the diesel particulate filter to exceed a predetermined preferable range for particulate trap performance." The spa value of Russell is an estimated value of the particulate matter trap amount. Thus, in Russell, when there is an error in the estimation of spa, regeneration of the DPF would continue even in a case where the actual particulate trap amount has reached substantially zero. Thus, in order to prevent such an unnecessary regeneration, it appears that Russell sets S4 to be a value larger than zero, where the aim of setting S4 is a complete regeneration of the filter while at the same time ensuring that regeneration does not continue inappropriately. Russell does not suggest that S4 is set to correspond to "a particulate matter trap amount which, when burned, does not cause the temperature of the diesel particulate filter to exceed a predetermined preferable range for particulate trap performance."

Moreover, while Russell discloses halting regeneration in order to avoid heat deterioration of the DPF by halting regeneration based on the temperature limit T5, this process does not meet the definition of claim 1, of "[determining] whether or not the particulate matter trap amount has reached a predetermined decrease state during a period when the exhaust gas composition is in the state corresponding to the lean air-fuel ratio, the predetermined decrease state corresponding to a particulate matter trap amount smaller than the predetermined amount", but is merely based on temperature.

Finally, Russell's disclosure of halting regeneration when a particulate temperature during nonregeneration operation (Tpn) is less than limit T6 and the stored particulate amount is less than limit S6 also does not meet the definition of claim 1, at least because Russell does not disclose that the limit S6 is "larger than zero and corresponding to a particulate matter trap amount which, when burned, does not cause the temperature of the diesel particulate filter to exceed a predetermined preferable range for particulate trap performance."

In sum, even if Kobayashi were modified to include the control of stopping regeneration in the manner disclosed by Russell, the combined control would not meet the definition of claim 1.

Moreover, there is no motivation to modify Kobayashi in the manner suggested in the Office Action based on the Russell disclosure. The heat deterioration of the DPF disclosed in Russell denotes a heat deterioration during a normal regeneration process of the DPF, not in the context of sulfur poisoning elimination. Thus, one skilled in the art would not have transferred the teachings of Russell to Kobayashi in the manner suggested in the Office Action.

Kobayashi and Russell also fail to disclose the advantages of the claimed regeneration control in the context of sulfur poisoning elimination. In claim 1, regeneration of the DPF performed during elimination of sulfur poisoning is terminated when the particulate matter trap amount has decreased to a value which, when burned, does not cause the temperature of the DPF to exceed a predetermined preferable range for particulate trap performance. In this case, the time required for elimination of sulfur poisoning is shortened while heat deterioration of the DPF due to an excessive particulate matter trap amount when the elimination of sulfur poisoning completes is prevented. Neither Kobayashi nor Russell suggests this claimed regeneration control in the context of sulfur poisoning elimination, or the advantages resulting therefrom.

Hirota was cited for allegedly disclosing using a lean exhaust gas composition to purge particulate matter from a diesel particulate filter, but fails to cure the deficiencies of Kobayashi and Russell.

Independent claims 12 and 13 include language corresponding to that discussed above with respect to claim 1, and thus are allowable for analogous reasons. Dependent claims 2-9 and 11 ultimately depend from claim 1, and are patentable for at least the same reasons, as well as for further patentable features recited therein. New claim 14 depends from claim 1, and is patentable for at least the same reasons, as well as for further patentable features recited therein.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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By _____

FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (202) 672-5414
Facsimile: (202) 672-5399

Richard L. Schwaab
Attorney for Applicant
Registration No. 25,479

Thomas G. Bilodeau
Attorney for Applicant
Registration No. 43,438